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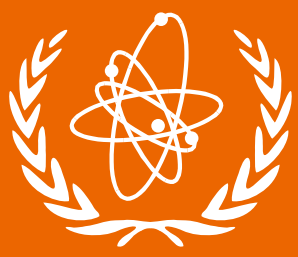

PAAT TECHNICAL AND SCIENTIFIC SERIES 6

LONG-TERM TSETSE AND TRYPANOSOMIASIS MANAGEMENT OPTIONS IN WEST AFRICA

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LONG-TERM TSETSE AND TRYPANOSOMIASIS MANAGEMENT OPTIONS IN WEST AFRICA

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Abstract

Tsetse-transmitted animal trypanosomiasis is a complex disease that directly and indirectly has an impact on Africa's crop and livestock agriculture. Over the past decade awareness of this fact has generated a drive and political will towards solving the problem at the continental scale. In this paper the authors use state-of-the-art spatial tools to study how, for West Africa, the variety of agro-ecological settings may have an impact on decision support towards that goal.

First, the authors describe an approach towards selecting priority areas for area-wide tsetse and trypanosomiasis (T&T) control, based on the mapping of:

- dominant livestock systems with particular emphasis on the integration of livestock and crop agriculture towards mixed farming practices;
- tsetse ecology bands linked to the geoclimatic settings prevailing in West Africa – a northern dry band with fragmented tsetse populations and a southern humid band where tsetse are widespread.

Priority areas are identified in the northern band of the tsetse belt where:

- tsetse populations are fragmented (and therefore vulnerable) or confined only to suitable vegetation along main river courses;
- fly reinvasion risk is minimal due to land pressure and adverse climatic conditions for tsetse;
- mixed farming predominates and an improved integration of crop and livestock agriculture may yield the highest benefits.

Second, three case studies are discussed: the Togo national study (FAO project GCP-TOG-013-BEL), and two studies in Burkina Faso – the Sideradougou pastoral area (Centre de Coopération Internationale en Recherche Agronomique pour le Développement [CIRAD]–Centre International de Recherche-Développement sur l'Élevage en Zone Subhumide [CIRDES]) project) and the Mouhoun

river basin (FAO project GCP-RAF-347-BEL). These three studies aimed at developing decision-support tools for the planning and implementation of integrated T&T control, based on holistic data sets on the spatial epidemiology of T&T (vectors, pathogens, hosts) and the impact of T&T on people, their environment and their livestock production systems. The studies are complementary, and therefore highly relevant to this paper, with regard to:

- the geoclimatic settings covered – in Togo a transect through humid to semi-humid West Africa, and in Burkina Faso from semi-humid to dry;
- the scale at which the studies were conducted – in Togo at the national level, and in Burkina Faso on the Mouhoun river at the river-basin level, and in the Sideradougou pastoral area at the village level.

It is clear from the results of the case studies that any decision support towards T&T management in West Africa must consider the fact that the epidemiology of tsetse-transmitted trypanosomiasis varies with varying climatic settings and land-use patterns. Therefore, the sustainable management of this major threat to animal health will have to be systematic, stepwise and pragmatic. Based on the experience gained in Togo and Burkina Faso a list of the data inputs needed to achieve such a high level of integration is given in Figure 15 (page 45).

It is concluded that an integrated T&T management approach relies on the quality of an extensive list of field data (vector, pathogen, host, livestock system, agro-ecological setting) and the detailed knowledge of geo-epidemiological patterns. We must remain cautious when making choices and avoid being lured into choosing overly simple solutions for complex problems.

Although in West Africa elimination of the fly and the disease may be achievable in the drier parts at the northern limits of the tsetse belt, several crucial assumptions remain to be validated through field research. These include investigations on fly fragmentation, population isolation and fly dispersion (e.g. Mouhoun model).

In the more humid parts, the most viable option remains an integrated approach combining:

- vector suppression in epidemiological hot spots (e.g. Sideradougou model), and
- disease management at the herd level through the strategic use of trypanocides and/or genetic improvement of local trypanotolerant breeds (e.g. Togo model).

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In Burkina Faso data on the Mouhoun river system were collected within the framework of the Belgium-funded FAO project GCP-RAF-347-BEL and complemented by data originating from recent work conducted by CIRDES teams and from the archive of Dr Issa Tamboura. Fieldwork on the Mouhoun river system (FAO project) was conducted by a team led by Issa Tamboura with the assistance of Zerbo L. Pierre, Daro Boukari, Sanou Tidiany and Sanou Siaka. The project also benefited from the technical input from Zowinde Koudougou.

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Much of the West African geographic information systems (GIS) work on livestock systems analysis, tsetse ecology bands and the selection of area-wide priority areas was conducted during a series of FAO/International Atomic Energy Agency (IAEA)-funded and PAAT workshops in Addis Ababa, Geneva, Rome and Vienna and was further refined for the purpose of this paper. This work benefited from many contributors including: A. Bado, D. Bourn, L. Budd, B. Dao, U. Feldman, R. Kastens, Z. Koudougou, C. Mahama, C. Mebrate, N. Okhoya, A. Serdebeogo, I. Tamboura and W. Wint.

Acronyms

AU	African Union (formerly the Organization of African Unity)
AW-IPM	area-wide integrated pest management
CIESIN	Center for International Earth Science Information Network
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
CIRDES	Centre International de Recherche-Développement sur L'Élevage en Zone Subhumide
ELISA	enzyme-linked immunosorbent assay
FAO	Food and Agriculture Organization of the United Nations
GIS	geographic information systems
IAEA	International Atomic Energy Agency
IIASA	International Institute for Applied Systems Analysis
IBAR	Interafrican Bureau for Animal Resources
ILRI	International Livestock Research Institute, Kenya and Ethiopia
ISCTRC	International Scientific Council for Trypanosomiasis Research and Control
LEAD	Livestock, Environment and Development
OAU	Organization of African Unity
PAAT	Programme Against African Trypanosomiasis
PATTEC	Pan-African Tsetse and Trypanosomiasis Eradication Campaign
PAAT-IS	PAAT Information Service

PCR	polymerase chain reaction
PCV	packed cell volume
T&T	tsetse and trypanosomiasis
WHO	World Health Organization